DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION SPECIFICATION

ASR TRANSPORTATION, ONSITE INSTALLATION, TESTING AND ACCEPTANCE

1. SCOPE

1.1 Scope of specification.- This specification contains requirements for the onsite installation, alignment, test and acceptance of the integrated electronic system package in two transportable buildings. Requirements are also given for test and acceptance.

2. APPLICABLE DOCUMENTS

2.1 FAA documents.- The following FAA specification standards and drawings, of the issue specified in the invitation for bids or request for proposals, form a part of this specification.

2.1.1 FAA specifications.-

FAA-G-2100	Part I, Electronic Equipment, General Requirements
FAA-C-1217	Electrical Work Interior
FAA-D-638	Instruction Books, Electronic Equipment
FAA-E-2506	ASR Transmitter/Receiver Subsystem
FAA-C-2507	ASR Transmitter/Receiver Building
FAA-E-2319b	Air Traffic Control Beacon Interrogator and amendments thereto
FAA-E-2318	Antenna, ATCRBS, Directional and amendments thereto
FAA-E-2502	Air Traffic Control Radar Beacon System (ATCRBS) Test Set
FAA-R-1401b	Antenna, ATCRBS, SLS Omni-Directional and amendments thereto

2.1.2 FAA drawings.-

D-5454-1 through 18	Airport Surveillance Radar, ASR-4 through ASR-7 Tower, Fabrication
D-5453-E1 through E16	Airport Surveillance Radar, ASR-4 through ASR-7 Tower, Erection
D-5419-1 through 12	Airport Surveillance Radar, ASR-4 through ASR-7 Tower, Design and Installation Details

2.2 Other publications.- The following publication, of the issue in effect on the date of the invitation for bids or request for proposals, forms a part of this specification.

2.2.1 National electrical code.- (Information on obtaining copies of the National Electrical Code may be obtained from National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts 02110.) (Copies of applicable FAA specifications, standards and drawings may be obtained from the Contracting Officer in the Federal Aviation Administration office issuing the invitation for bids or request for proposals. Requests should fully identify material desired, i.e., specification, standard, amendment, and drawing numbers and dates. Requests should cite the invitation for bids, requests for proposals, or the contract involved or other use to be made of the requested material.

3. REQUIREMENTS

3.1 Equipment and services to be furnished by the contractor.- The contractor shall furnish all materials and services necessary to install, align, and test the ASR electronic equipment package and specified contract schedule equipment at locations specified by the Government. The ASR system complex shall be completely operational and ready for FAA flight testing upon completion of these tasks. Any equipment, item, part or service, not specifically designated in the contract as Government furnished, necessary for the proper operation of the system in accordance with this specification shall be furnished by the contractor even though that equipment, item, part or service may not be specifically provided for or described herein.

3.1.1 Summary.-

a. Standard system configuration installation

b. Acceptance data package

3.2 Definitions.-

3.2.1 HVAC.- Heating, Ventilating and Air-conditioning.

3.2.2 ASR.- Airport Surveillance Radar.

3.3 Air traffic control operating constraints.- When the construction, installation and testing of equipment is performed in an operating environment, air traffic control activities and services shall have a priority over all contractor activities. There shall be no compromise in the safe and timely control of aircraft during these phases. The design of installation and testing procedures shall be based on continued use of existing navigational aids. Installation services shall be performed in such a manner that disruptions to operating air traffic control facilities shall be minimized. Contractor actions that will interfere with or in any way have an impact on air traffic control activities and services shall be coordinated with and approved by the Contracting Officer or his designated representative in advance.

3.4 General installation requirements.-

3.4.1 Conduct of installation.- The contractor shall schedule, coordinate, and staff his efforts for expeditious accomplishment with an absolute minimum of disruption to on-going Government operations and the surrounding neighborhood. Once off-loading of buildings, antennas, and equipment has started, installation work shall proceed on a regularly scheduled basis, without contractor induced lapse, through completion.

3.4.2 Grounding system.- The grounding systems of the ASR building shall be connected to the site earth ground system by the contractor. An earth ground system shall be provided by others at each site in accordance with FAA-C-1217. The separate ground systems of the buildings, substations, and towers shall be interconnected on the earth ground system in accordance with FAA-C-1217 by others. The earth ground system at each site shall be tested by others in accordance with Paragraph 4.2 of Specification FAA-C-1217 before a connection is made to the building by the contractor.

3.4.3 Power distribution loading.- The contractor shall connect all electrical loads to the site power distribution systems in accordance with the following phase balancing requirement. The power distribution shall provide for balance loading of phases (within 10%) where three phase service is employed with all equipment in normal operation.

3.5 Standard system configuration installation.-

3.5.1 Transmitter site.-

3.5.1.1 ASR building installation.- The contractor shall transport, set in place, and secure the ASR building provided by Specification FAA-C-2507. Installation shall include alignment, leveling, attachment of detached items such as canopies, skirts, steps, seals and frames around openings and closures, unpacking and all other work required to ready the building for operation.

3.5.1.2 Electrical connection.- Government-furnished incoming power cable and conduit from the engine generator building shall be connected into the Module "A" power panel. Conduit shall be provided between the Module "A" power panel and the conduit stub beneath the building by the contractor. Conduit and conductor connections shall be made from Module "A" to Module "B" power panel. The power distribution system shall be energized and phase sequences checked. All power distribution circuits and building service systems, lights, HVAC, and outlets shall be energized and checked for operation.

3.5.1.3 Installation of conduit, ductwork and wiring.- All wiring, conduit, and ductwork required to interconnect the two modules shall be installed in accordance with the building plans and specifications. All wiring and conduit required to interconnect the antennas and tower to the power and electronic systems shall be provided and installed. The antenna tower will be constructed by others per (ref. 2.1.2) drawings. The heights of the antenna at individual sites shall be specified in the contract schedule.

3.5.1.4 Antenna placement and assembly.- The contractor shall rig, lift, place, and secure the individual components of the ASR antenna, the ATCRBS directional antenna, and the ATCRBS omni-directional antenna on top of the antenna tower. The antennas shall be installed level, plumb, and true to meet the requirements of the system design.

3.5.1.5 Waveguide, RF coaxial cable and supporting hardware installation.- The contractor shall provide and install the ASR waveguide, the ATCRBS coaxial cables (RG-218), connectors, adaptors and all necessary supporting hardware between the equipments and associated antennas.

3.5.1.6 Installation of signal and control interface.- The contractor shall provide, install, and connect all necessary signal and control interface cabling (wiring) between the ASR building modules and between the ASR building and the antenna tower mounted equipment. The contractor shall provide conduit between the underground entrance of control and video cables and the radar cable junction box (RCJB). The contractor shall install the conduit and shall pull all the cables into the RCJB and terminate.

3.6.- Not used.

3.7 System alignment and checkout.-

3.7.1 Electronic equipment.- The contractor shall exercise all system controls to insure their proper operation; trace the video signals (MTI, Normal, Beacon) through their associated equipments to the Monitor PPI and to the RCJB. The system shall be properly aligned and tuned up to peak performance. The electronic equipment shall be thoroughly tested onsite and parameters recorded (per. 3.12.7.3.3) to show optimum system capability. After all the data is recorded, the equipment shall be left on in normal operation for 72 hours of continuous operation. No adjustments shall be made during the 72 hour test period. At the end of the 72-hour period, all readings shall be rechecked to insure that the system is still operating within all specifications.

3.7.2 ASR and ATCRBS antenna orientation and alignment.- The contractor shall align the ASR and ATCRBS antennas and orient the antennas to magnetic north (± ½ degree). The azimuth pulse generator shall be properly zeroed.

3.7.3 Mechanical and electrical equipment.- All electrical and mechanical equipment provided by the contract schedule of this specification shall be aligned and adjusted to the proper operating parameters for the installation site. All equipment shall be operated to demonstrate compliance with the requirements of this specification and the approved designs.

3.8 Cleaning.- The contractor shall deliver to the Government a clean facility both inside and out.

3.8.1 Interior.- The contractor shall remove all trash and foreign material from the interior of the buildings. Damage and finish degradation to any building, electronic subsystem interiors, or exterior surfaces, and other installed equipments resulting from transportation and installation activities shall be repaired or replaced as necessary to bring the installation workmanship up to a condition equivalent to that of conditional acceptance at the contractor's plant.

3.8.2 Exterior.- The exterior of all buildings shall be cleaned of all dirt and film resulting from transportation and installation prior to acceptance by the Government. All trash, litter, packing dunnage and excess material shall be removed from the facility area.

3.9 Installation personnel.- The contractor shall use only experienced, factory trained personnel for installation and installation supervision of field work performed. Subcontractors used by the contractor for rigging, crane service, labor, trash removal, cable splicing and other miscellaneous work and services shall be the direct responsibility of the contractor and under his direct supervision at all times.

3.10 Test equipment.- Where specialized test equipment, test jigs, etc., are required for the subsystem and system testing but is not required for the routine maintenance of the system, the contractor shall be required to supply the necessary specialized test equipment, test jigs, etc. All other test equipment will be GFE onsite test equipment.

3.11 Spare parts.- The Government will be responsible for supplying the necessary spare parts for GFE during the installation and checkout phase of the program. The contractor shall maintain a log identifying all parts consumed during the installation, checkout and test phases of the program. Contractor shall supply the necessary spare parts for contractor furnished equipment during the installation, checkout, and test phase of the program. If any of the original contractor furnished spare parts are used in the contractor furnished equipment, the contractor shall replenish those parts so as to provide a complete set of original spares prior to acceptance.

3.12 Acceptance data package.- For each site specified in the contract schedule, the contractor shall furnish two complete copies of the acceptance data to the Government representative at the time of onsite delivery of equipment.

3.12.1 Preliminary acceptance data package.- The contractor shall furnish three complete acceptance data packages to the Contracting Officer 105 days prior to delivery onsite of the first system. One copy of the manuscript will be returned to the contractor with the Government's comments no later than 45 days after receipt of the preliminary acceptance data package from the contractor. The contractor shall incorporate the Government's comments and return for Government approval within 30 days of receipt from the Government. The Government will approve or disapprove the manuscript within 30 days of receipt by the Government from the contractor.

3.12.2 through 3.12.6.- Not used.

3.12.7 Acceptance data.-

3.12.7.1 General concept.- The onsite acceptance data will be used as the basis for acceptance of the onsite installation and testing at each site. In addition, this report, certified at time of system commissioning, will be used thereafter as a maintenance reference datum for engineering analysis of system performance during periodic inspections, or following corrective action, to isolate system weak points and to establish continuity of certified system operation in event of an aircraft accident investigation.

3.12.7.2 Acceptance record.- The acceptance record shall contain a statement of acceptance of the system complex by the Government as meeting the specification requirements and provide for signature of Government and contractor representatives.

3.12.7.3 Sections.- The balance of the report shall be broken into sections as specified in the subparagraphs below. All sections of the acceptance data package shall be incorporated into one binder with provisions for easy removal and provisions to add new pages to the binder in the field.

3.12.7.3.1 Section I Site preparation.- This section shall contain the necessary procedures and a check list to insure that the site preparation has been accomplished in accordance with the requirements of this specification and the site preparation construction package and is ready for the installation of the electronic equipment system package.

3.12.7.3.2 Section II Mechanical and electrical installation.- This section shall contain procedures and a check list to insure that the installation of the buildings, antennas, waveguides, cabling (wiring), power wiring, conduit, ductwork, grounding, support hardware, etc., have been installed in accordance with specification requirements and good engineering practices. The acceptance of all electrical and mechanical equipment shall be subject to proper operation in accordance with all requirements of this specification and the approved designs while functioning as an ASR system at each established site.

3.12.7.3.3 Section III Operational performance.- This section shall contain thorough procedures and recording spaces for accomplishing a technical appraisal of the system operational performance including the standby power plant where installed. All essential operational parameters, adjustment data, and meter readings necessary to determine acceptable performance or required for future verification for evaluation and comparison shall be included. Intermediate parameters, such as waveforms, voltages or resistance measurements primarily used in trouble shooting and available in the instruction book are not required. Standards from applicable FAA specifications and equipment design criteria shall be specified for all waveforms, meter readings, and adjustments. In addition, data used for analyzing future system performance, such as PPI photographs of the operating system and PPI photographs with negatives of normal radar clutter at normal system sensitivity and at sensitivity reduced to 70 dB below normal sensitivity taken in 10 dB steps shall be included.

3.12.7.3.3.1 Format of Section III.- The information pages shall contain the following information (where applicable) for each parameter to be measured and recorded:

a. Parameter (name, test point, etc.)

b. Standard (standard value or setting)

c. Procedure and test equipment required for measurement

d. Equipment control settings

e. Space for data, photograph

f. Space for initials of person making measurement and an observer

3.12.7.3.4 Section IV Equipment inventory.- An inventory of all units installed in the system listed by FAA type number, unit description and unit serial number.

3.13 Facility commissioning.- The Government will be responsible for all commissioning procedures.

4. QUALITY ASSURANCE

4.1 General requirements of quality control program.- The contractor shall perform those tests and performance checks identified in the acceptance report specified in 3.12.7 herein. Complete system performance shall be documented jointly by the contractor and the Government. The contractor shall provide the Government at least two days notice of intent to start onsite system acceptance testing. Acceptance testing shall not proceed without official Government representation.

5. PREPARATION FOR DELIVERY.- Not applicable.

6. NOTES

6.1 Note on information items.- The contents of the subparagraphs below are only for the information of the Contracting Officer. They are not contract requirements, nor binding on either the Government or the contractor, except to the extent that they may be specified elsewhere in the contract as such. Any reliance placed by the contractor on the information in these subparagraphs is wholly at the contractor's own risk.

6.2 Acceptance requirements.- Prior to final acceptance of the ASR system, the 72-hour operational test shall have been successfully completed and the equipment shall be operating within all equipment specifications (ref. FAA-E-2506.

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